TITLE OF THE INVENTION

Method and Apparatus for Notifying Users of Filtered E-Mail using a Set Top Box.

5   ## FIELD OF THE INVENTION

The present invention relates to the field of set top boxes (STBs). More particularly, the invention relates to STBs working with e-mail servers to provide notification to users of the arrival of selected e-mails.

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BACKGROUND OF THE INVENTION

Fig. 1 is a representative block diagram of a conventional cable TV system. A set top box (STB) 10 contains electronic equipment that is used to connect a
15   subscriber's TV 12, and potentially other video electronic equipment, with a TV content provider 14. An STB 10 is essentially a rudimentary computer without floppy disc or CD ROM drives that is programmed to process programming and potentially other services from a provider 14. As
20   shown in Fig. 1, STBs can be connected to a TV provider 14 via cable modem 16, satellite 18, or even broadcast antennae 20. Presently, the highest percentage of STBs 10 are connected to cable TV providers 14 through a coaxial wall outlet.
25   Services provided by a TV provider 14 typically include access to a number of TV channels and sometimes an electronic program guide. Additional premium channels may

also be provided to subscribers at an additional fee. Pay-per-view events and video-on-demand may also be supplied by the TV provider 14. The STB 10 is programmed to furnish these and other services to the subscriber.

5   However, some TV providers also offer Internet access and e-mail accounts. Many different combinations of TV programming, web access, and e-mail services are commercially available.

One such combination of TV programming and web/e-mail
10   access is shown in Fig. 2. Accessing such a service from the Internet Service Provider (ISP) 15 requires a STB 10, a conventional TV 12 to connect the STB 10, and a telephone line to sign up and access the service. As shown in Fig. 2, such an arrangement also includes a wireless
15   keyboard 22 of the typical computer QWERTY style, a ordinary wireless remote controller (24) like that found with a TV 12, and a 56K modem 26. The keyboard 22 can be used by the user during operation of the STB 10. However, a substantial portion of the user-selectable options do
20   not require use of the keyboard 22, and can be accomplished using the ordinary remote controller 24. The keyboard 22 is essential in setting up the STB 10 and selecting various options, but might go unused for long periods of time after set up. Also, during set-up, the TV
25   12 screen can show a display of a keyboard through which a user can designate letters using the ordinary remote controller 24.

When setting up the STB 10 and ISP 15 connections for the first time, users are asked a few questions so that the ISP can then detect the TV programming received from their local cable, broadcast, or satellite TV provider 14.

5   However, the combination of TV programming and web/e-mail access from the ISP 15 does not replace these types of TV programming, but is an additional online service that is intended to enhance the television viewing experience, not supplant it. For example, a STB user can compete in real

10   time with the contestants appearing on the quiz shows, and can have his or her score continually updated on a portion of the TV screen 12. The user can also compare the score with the scores of other STB quiz show players. Similarly, viewers of professional sports games can obtain detailed

15   player statistics far beyond what is displayed by the TV network.

An additional Internet utility available using STBs is Instant Messaging, where messages from selected users can be displayed directly on the TV 12 connected to the

20   STB 10. Another feature of Instant Messaging is that it allows users to control who can see when they are online and who can send them messages. However, these messages are not in a typical Internet e-mail format, and are only filterable to the extent that a user can add or delete

25   persons from their buddylist, or list of other people capable of sending instant messages. Also, if the Instant Messaging software application 28 is not enabled, a user

will not know that another person is attempting to contact that user via Instant Messaging.

As stated, STB users can have a wide range of online content to choose from. However, no provision is made for preempting the STB video data to signify the arrival and priority of a traditional Internet e-mail 32. During the operation of an STB 10, the TV content normally owns the entire screen, and is not pre-emptible without user interaction. Thus, the screen area belonging to the TV 12 looks quite different from a regular computer with a windowed user interface. Because STBs are intended, in general, to carry one primary video event to a user, there is not much need for separate screen partitions or divisions of the screen area. Consequently, STBs do not normally make provision for dividing the screen, or any other complex video management involving dedicating a portion of the screen to a specific event not related to the primary video datastream.

Furthermore, conventional Internet e-mail accounts that are not sold with STB services are difficult if not impossible to be accessed from a STB 12. Thus, such a conventional STB 10 cannot notify the user of an arrival of an Internet e-mail 32 from a non-STB e-mail account. Additionally, a conventional STB 10 lacks the sophistication necessary to notify the user of the arrival of an Internet e-mail 32 which satisfies user-specified e-mail filter criteria 36.

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Finally, when a new STB 10 is added to an ISP 15, it must be initialized. To initialize a STB 10, the STB 10 must be provided with the programming required to allow it to function within the specific ISP 15 to which it is connected and to thereby provide the services for which the subscriber has paid. Additionally, as the TV provider 14 and its accompanying services evolve, the STB 10 must also evolve to continue providing subscribers with as many of these services as possible. Such an evolution will primarily involve changes to the programming, and perhaps a re-initialization, of the STB 10.

In order to initialize a new STB 10 or upgrade the programming in an existing STB 10, it is preferable to transmit the necessary programming to the STB 10 via the TV provider 14 network. Otherwise, a technician must visit each subscriber to install or upgrade the STB 10. Such field installations and upgrades would obviously be at significant expense. Software that is provided to the population of STBs could be downloaded through the ISP (15), or through the TV provider 14. However, such a download requires that the STB 10 contain some intelligence in order to properly react to and manage such a download. This is because there are many different versions and capabilities of STBs in existence, and it is important to be able to determine which STBs can support which levels of software.

Thus, there is a need for an STB that can notify users of the arrival of certain e-mail messages, where that notification occurs as a result of user-specified filter criteria and that an e-mail account exists outside

5   of the STB arrangement. Also, there is a need for a STB to notify a user of the arrival of such e-mail by using a portion of a TV screen. Finally, because there are many different types of STBs in existence, there is a need for a way of downloading new STB applications that can

10   determine the capabilities of a particular STB so that the appropriate application can be downloaded thereto.

SUMMARY OF THE INVENTION

15   It is an object of the present invention to meet the above-described needs and others. Specifically, it is an object of the present invention to query and filter e-mails and notify a user of their arrival via a Set Top Box connected to a TV.

20   To achieve these stated and other objects, the present invention is embodied and described as a software application residing on a STB which queries an e-mail server and notifies a user that an e-mail message fulfilling specific filter criteria has arrived. In a

25   preferred embodiment, the e-mail filtering and notification application resides on a Set Top Box (STB) which is connected between a TV content provider, an

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Internet provider having an e-mail server, and a TV; a
software program resident on the STB which allows a user
to specify e-mail filter criteria and notification icons
which then retain and store those criteria and icons. The
software program preferably includes a querying module
which queries the e-mail server to determine whether e-
mail fulfilling the user-specified criteria has arrived at
the e-mail server, and upon arrival of an e-mail
fulfilling the criteria, the application notifies the user
by posting the notification icons to the STB.

The application may also either continually or
occasionally query the e-mail server, and may run on top
of either a multi-tasking or a single-tasking Operating
System (O/S). In the single-tasking case, the application
remains in memory as a Terminate and Stay Resident (TSR)
program and runs intermittently at specifically timed
intervals.

The application may also notify the Set Top Box user
via an icon on the TV screen, where the notification icon
is configurable by the user, and can reflect the content
of the targeted e-mail. Alternatively, the application can
notify the STB user through the use of a tone generated
through the TV speaker, where the tone is configurable by
the user, and can reflect the content of the targeted e-
mail. The application can also notify the STB user of more
than one e-mail messages, where each message satisfies
different criteria and has different notification icons.

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The application can also query the e-mail server upon power up of the STB, and then immediately notify the user of the existence of e-mails satisfying the user-specified criteria. Alternatively, the application can notify the user by use of a pager rather than through the STB. Also, the application can notify the user of the existence of a telephone call with Caller ID instead of an e-mail message, or can notify the user that another user is attempting to make contact using Instant Messaging.

Furthermore, updated versions of the application can be downloaded to the STB by said Internet provider, where that downloading of newer versions can distinguish between different types of STBs.

The application can also be resident on the e-mail server rather than the STB, or resident on a middle or intermediate server.

The present invention also encompasses the methods of implementing and operating the application described above. For example, the present invention expressly includes a method of filtering e-mail messages and notifying a user by installing a software program on a STB, wherein the STB is connected both to a TV content provider and an e-mail server; configuring that program with specific e-mail criteria and notification symbols; queuing incoming e-mail messages at the e-mail server; querying the e-mail server as to whether any of the queued messages fulfill the criteria; and notifying a user that

e-mail messages fulfilling the criteria are available on the e-mail server.

The present invention also encompasses the means of implementing and operating the application described above. For example, the present invention expressly includes an e-mail filtering and notification application including a STB, connected amoung a TV content provider, an Internet provider having an e-mail server, and a TV; user-input means for allowing a user to specify e-mail filter criteria and notification icons; retaining and storing means for retaining and storing the criteria and icons; querying means, for querying the e-mail server to determine whether e-mail fulfilling the user criteria has arrived at the e-mail server; and notification means for notifying the user of the arrival by posting the notification icons to the STB.

Additional objects, advantages and novel features of the invention will be set forth in the description which follows or may be learned by those skilled in the art through reading these materials or practicing the invention. The objects and advantages of the invention may be achieved through the elements disclosed and recited in the attached claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings illustrate the present invention and are a part of the specification. Together with the following description, the drawings demonstrate

5   and explain the principles of the present invention.

Fig. 1 is a plan view of a conventional STB connected between a TV and a TV content provider.

Fig. 2 is a plan view of a STB configuration which incorporates Internet services.

10   Fig. 3 is a plan view of a STB running the software according to the present invention, connected between an e-mail server and a TV content provider.

Fig. 4 is a plan view of the hardware within a STB used with the present invention.

15   Fig. 5 is a plan view of the software within a STB used with the present invention.

Fig. 6 is an elevational view of a TV screen running the filtering/notification application of the present invention.

20   Fig. 7 is plan view of the STB running the filtering/notification application of the present invention connected between a TV provider and an e-mail server.

Fig. 8 is plan view of the STB connected to a TV

25   provider and to an e-mail server, where the filtering/notification application of the present invention resides on the e-mail server.

Fig. 9 is a plan view of the STB connected between a
TV provider and a middle server, wherein the middle server
is also connected to an e-mail server, where the
filtering/notification application of the present
5   invention resides on the middle server.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Using the drawings, the preferred embodiments of the
present invention will now be explained.
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HARDWARE ARCHITECTURE OF AN STB

Fig. 4 illustrates the hardware layout of a typical
STB 10 used with the present invention, including a CPU 42
and the three different types of memory in an STB 10.
15   These three different types of memory include a read-only
memory unit (ROM) 44, a flash memory unit 48, and a random
access memory unit (RAM) 54.

The ROM 44 contains the boot code 46 and platform
identifier 56. Boot code 46 will be explained in the
20   "Software Architecture of an STB" section below. Many
different varieties of STBs exist, with widely varying
technical capabilities. Because of this, each STB 10
preferably contains a platform identifier 56 that is
specific to the type, architecture and capabilities of
25   that particular STB 10.

A flash memory unit 48 contains the base platform code 50 and the Operating System (O/S) object 52. The RAM unit 54 can use disc storage or some other type of permanent storage. Downloaded software objects such as the

5   base platform code 50, the O/S 52, and so forth may be temporarily stored in the permanent memory or the RAM 54, and then transferred from the RAM 54 to the flash memory unit 48 for longer-term storage. It is advantageous to store the O/S 52 and applications in the flash memory 48,

10   rather than the disc RAM 54, because the flash memory 48 can be accessed more quickly.

SOFTWARE ARCHITECTURE OF AN STB

As shown in Fig. 5, there are four general tiers or

15   classifications of software that run on or have control of the STB 10 during its different stages in the initialization and operation. The four tiers are the boot code 46, the base platform code 50, the O/S code 52, and the application code 58.

20   Referring to Fig. 5, the first classification of code is the boot code 46, which resides in the STB 10 preferably in the read-only memory (ROM) 44, and can automatically execute and initialize or re-initialize the STB 10. The boot code 46 and platform identifier 58 are

25   shown in both Fig. 4 (STB hardware) and Fig. 5 (STB software) because they are a hybrid combination of the two, perhaps better described as firmware. The boot code

46 will preferably be automatically executed by the

central processor 42 of the STB 10. Execution of the boot

code 46 may be triggered by and immediately follow

connection of power to the STB 10, or can be triggered by

5   the user. The present invention can also require

connection to the TV content provider 14 before an

execution of the boot code is triggered. While the boot

code 46 is executing, no action by the user/installer

should be required.

10   As shown in Fig. 5, the ROM 44 which is factory-

installed in the STB 10 will also include a platform

identifier 56 that is specific to the type, architecture

and capabilities of the STB 10. When running, the boot

code 46 will attempt to match software-download

15   information with the platform identifier 56. Thus, the

boot code 46 can determine whether a transport stream from

either TV provider 14 or the ISP 15 is appropriately

targeted for the correct STB 10.

While running the boot code 46, the STB 10 cannot

20   provide any services to the subscriber. One function of

the boot code 46 is to search the datastream received from

the TV provider 14 to locate, acquire and begin execution

of the base platform code 50 which is the next tier or

classification of programming. If the boot code 46 cannot

25   find the base platform code 50 within the STB storage 48

or 54, the boot code 46 will search the data transport

stream from the provider facility 14 for the base platform code 50.

As will be understood by those skilled in the art, the platform identifier 56 of the present invention can be used to check any type of code object for its compatibility with the STB 10. The platform identifier (56) is not limited to use by the boot code 46 only. The platform identifier 56 can also be used by the base platform code 50 to identify and acquire an O/S 52 or applications 58 object designed for downloading to a particular STB 10.

The base platform code 50 has two functions. The first function is to provide the basic capability of allowing a subscriber to watch programming from the TV provider (14). The second function is to control the download of the next classification of code objects, i.e., the target O/S 52, and resident applications 58. The base platform code 50, while allowing subscribers to watch TV programming, does not generally support any additional functions of the STB 10. However, the base platform code 50 can acquire, authenticate, authorize and execute objects of the third and fourth classifications of programming, the O/S 52 and applications 58.

When the base platform code 50 begins executing, the execution of the boot code 46 is completed and control of the STB 10 passes to the base platform code 50. The base platform code 50 may be factory loaded, but is preferably

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transmitted to the STB 10 from the TV provider 14 during the initialization of the STB 10. This allows the TV provider 14 to customize the base platform code 50 for optimal operation on the specific provider system where the STB 10 is deployed.

The O/S 52 and resident applications 58 provide the additional STB functions available from the TV provider 14, including the filtering/notification application 38 of the present invention. The O/S 52 can be proprietary software from a third party (such as Microsoft's WinCE™) that provides an interface to the STB used by the resident applications 58. In the present invention, the O/S 52 can be either of the multi-tasking or single-tasking variety. In the single tasking case, the filtering/notification application 38 can be stored in the STB's flash memory 48, similar to a Terminate-and-Stay-Resident (TSR) program. At scheduled times, the application 38 can be "woken up" , where it will then query the e-mail server 40, which holds the actual e-mails as shown in Fig. 3.

The other STB O/S alternative is where the O/S (52) is a multi-tasking type. In such a case, the filtering/notification application 38 can reside in a memory region assigned by the O/S 52, and can then request the use of the STB system resources from the O/S (52). At such time as the request is granted, the application (38) can then query the e-mail server 40.

STB applications 58 are software programs that run on top of, and work with, the STB's O/S 52 to provide the STB capabilities that accompany the watching of television programming. The e-mail filter/notification program 38 of the present invention is such a STB application.

DETAILS OF E-MAIL SERVER 40

Fig. 3 shows a STB 10 running the e-mail filtering/notification application 38 of the present invention, connected to an e-mail server 40 and also to a TV content provider 14.

The e-mail server 40 can be using IMAP (Internet Message Access Protocol), which is a standard protocol for accessing e-mail on a local server. IMAP (the latest version is IMAP4) is a client/server protocol wherein e-mail is received and held by a user's e-mail server. Using IMAP, an e-mail client such as an STB 10 can view just the heading and the sender of the letter and then decide whether to download the mail to an e-mail client 34. An e-mail client 34 can create and manipulate folders or mailboxes on the e-mail server 40, or delete e-mail messages. In the present invention, the e-mail client will also be referred to as an Internet workstation 34, and should not be confused with a STB 10.

Another, less sophisticated e-mail protocol is POP3 (Post Office Protocol 3). With POP3, e-mail is saved in a mail box on the server. When a user reads the mail, all of

it is immediately downloaded to the Internet workstation
34 and is then deleted from the server.

FUNCTIONS OF FILTERING APPLICATION 38

5   As shown in Fig. 6, the e-mail filtering/notification
application 38 of the present invention can non-
intrusively post a notification of appropriately filtered
incoming e-mail 32 to the TV screen 12 upon the e-mail
message's arrival at the e-mail server 40. The application
10   38 does so without interfering with or interrupting the TV
provider's content 14, and appropriates only a tiny
portion of the TV screen 12 merely to blink a user-
customized icon 60 and optionally include an additional
color or sound to indicate level of urgency.
15   Alternatively, the filtering/notification application 38
of the present invention can attract the attention of the
user independently of the STB 10 such as through use of a
pager 62.

An additional alternative exists where the
20   filtering/notification application 38 can notify the user
of impending Instant Messages, as well as telephone calls
utilizing Caller ID. However, in the remaining portions of
this disclosure, the media which are subject to filtering
and which then cause notification will be referred to as
25   e-mail messages 32, even though Instant Messages and
telephone calls with Caller ID could also trigger user
notification.

In all embodiments, the actual e-mail messages 32 themselves do not arrive at and are not viewable from the STB console 10 and TV 12. Instead, as shown in Fig. 7, the e-mails 32, referred to as a queued e-mail message, are

5 staged at the e-mail server 40, where they can then be downloaded to a Internet user's workstation 34. In the first embodiment, the filter criteria 36 designating the types of e-mails of which the user wishes to be notified will reside at the STB 10.

10 However, the present invention has two other embodiments. The second embodiment has the filtering/notification application 38 residing on the e-mail server 40, not on the STB 10, as shown in Fig. 8. In this embodiment, the user-customized icons are posted to

15 the screen of the TV 12 by the e-mail server 40 instead of by the STB 10.

A third embodiment is one in which the filtering/notification application 38 resides on a middle server 64, located between the STB 10 and the e-mail

20 server 40, as shown in Fig. 9. A middle server 64 is advantageous where the e-mail server 40 is running a POP3 protocol. This is because in a POP3 server, all e-mails 32, even those not fulfilling the filter criteria 36 specified by the user, are downloaded and removed from the

25 e-mail server 40 whenever touched by the client. Thus, a middle server 64 acts as an intermediary to prevent e-mail messages 32 that are touched, but do not fulfill filter

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criteria 36, from being erased altogether.

In the embodiment in which the user-configured e-mail filtering/notification application 38 resides on the STB 10, the application 38 can poll the e-mail server (40),

5   either continuously or at selected times, querying whether any e-mail messages 32 fulfilling the user's filter criteria 36 have arrived.

How often the application 38 polls the e-mail server 40 depends on the type of connection therebetween. If the

10   connection between the STB 10 and e-mail server 40 is a permanent one such as a DSL or an ISDN, the filtering/notification application 38 can repeatedly query the e-mail server 40 and apply the filter criteria 36 to any messages queued therein. Otherwise, if the connection

15   is an occasional-use type, such as a dial-up connection over POTS (Plain Old Telephone Service), the filtering/notification application 38 can originate a telephone call to the e-mail server 40 at a low call-volume time, such as 2 AM. The filtering/notification

20   application 38 can then apply the filter to any e-mail messages on the e-mail server 40 that are queued up for delivery. Cable modems 16 fit somewhere 'in-between' permanent and occasional STB/e-mail server connections. This is because some cable TV providers 14 are only

25   equipped to transmit data in one direction, from the provider 14 to the user (downstream). These TV providers 14 require a telephone line for any instance where it is

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necessary to transmit data from the user to the TV

provider 14 (upstream). Other cable TV providers 14 are

equipped to allow for the movement of data both downstream

and upstream without requiring an additional telephone

5   line.

ICONS 60

Regardless of the type of connection, upon receipt of

an e-mail message 32 that passes all filter criteria 36,

10   the application 38 begins posting a blinking icon 60

signifying the presence of such an e-mail message (see

Fig. 6). In the event the STB 10 is not in use at the time

the filter criteria are passed, the filtering/notification

application 38 could begin posting a blinking icon 60 or

15   play a sound file whenever the STB 10 is activated by the

user.

The user can, when inputting the filter criteria 36,

also customize the On-Screen Display OSD software 30 to

display data or icons 60 related to the subject matter, or

20   play an audible tone or customized sound file.

Notification icons 60 could, as shown in Fig. 6 for

example, incorporate the word "Sony" (suggesting e-mail

from an employer) or incorporate the word "Tom"

(suggesting e-mail from a personal acquaintance).

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SETTING UP STB SOFTWARE

There are two distinct phases of programming an STB
10. The first is the initial programming of the STB 10.
The second is upgrading the programming or

5   reinitialization of the STB 10 after that STB 10 has been
placed in service. This section will discuss the first,
initial programming of the STB 10.

The boot code 46 is preferably factory-loaded in the
read-only memory (ROM) of the STB 10 and is executed as

10   soon as AC power is provided, but may also be triggered by
the user. Whenever executed, the boot code 46 acquires and
loads the base platform code 50, which may be obtained
from the TV provider 14 or may be factory-loaded along
with the boot code 46.

15   The base platform code then acquires the O/S 52. The
base platform code 52 is not limited, however, to
acquiring the O/S 52 and other software objects only when
first executed. Additionally, base platform code 52 can
acquire O/S code 52 while loaded and running. One way this

20   can occur is in response to an initialization message from
the TV provider 14.

UPGRADING STB SOFTWARE

As the TV provider 14 and ISP 15 services evolve, the

25   STB 10 configuration must also evolve. This STB evolution
will primarily involve changes to the O/S 52 and
applications 58, and perhaps a re-initialization of the

STB 10. By upgrading the software, such as the filtering/notification application 38 described herein, a STB 10 can be made to perform more efficiently or offer new services as the TV provider 14 services evolve.

5   Additionally, each STB 10 should be periodically reprogrammed or upgraded to continue to function optimally within the evolving TV provider 14 network. Each time the programming of an STB 10 is changed, including the filtering/notification application 38 of the present
10   invention, any new code must be appropriate to the architecture and capabilities of that STB 10.   The preceding description has been presented only to illustrate and describe the invention. It is not intended to be exhaustive or to limit the invention to any precise
15   form disclosed. Many modifications and variations are possible in light of the above teaching.

The preferred embodiment was chosen and described in order to best explain the principles of the invention and its practical application. The preceding description is
20   intended to enable others skilled in the art to best utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the following claims.